

# A Community Hospital Immunization Program

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WITH THE ADVENT of modern vaccines, diseases such as smallpox, poliomyelitis, and diphtheria are now essentially preventable. Although a confirmed indigenous case of smallpox has not been reported in the United States since 1949 according to the Surveillance Section of the Public Health Service's Communicable Disease Center, cases of diphtheria and poliomyelitis continue to occur. In 1965, 160 cases of diphtheria and 59 of poliomyelitis were reported to the Communicable Disease Center (1).

Persons with such illnesses, especially prior to diagnosis, obviously present a serious threat to others. Certain persons within the community who are especially subject to exposure to communicable diseases are considered members of high-risk groups. Foremost among these are physicians, dentists, nurses, hospital personnel, and ambulance attendants (2). Persons with

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irregular or limited exposure to patients, such as laundry handlers, cooks, and hospital carpenters, have also contracted disease as a result of their indirect contact with hospitalized patients.

This threat to others from persons with communicable diseases was demonstrated in Great Britain in 1961-62 when several people with smallpox, accidentally admitted into the country, infected 62 other persons, resulting in 26 deaths. Of these, 40 cases and 21 deaths occurred in 3 physicians, 1 nurse, 2 hospital visitors, 33 hospital patients, and 1 hospital employee (3).

Analysis of 11 serious outbreaks of smallpox following importation into Europe since December 1961 reveals that 96 of 222 indigenous cases and 29 of 39 deaths occurred among persons known to have acquired the disease directly through hospital contact (4). When a patient suspected of having smallpox was recently admitted to a Washington, D.C., hospital, health officials were reawakened to the vast problems involved when such a disease is introduced into a susceptible population (5). For this reason the American Medical Association, the American Hospital Association, and the Public Health Service recommend that hospital personnel keep current their immunizations against smallpox (personal communication, J. D. Millar, Smallpox Surveillance Section, Communicable Disease Center, March 1965).

Hospital personnel may also be considered vulnerable to other infectious diseases, such as

diphtheria and poliomyelitis. A 4-year schedule, with leap year providing a convenient guide, has been recommended for smallpox, diphtheria, and poliomyelitis inoculations (6).

### **Background**

Metropolitan Omaha with a population of approximately 400,000 persons has 13 hospitals with a total complement of about 7,500 persons. During the spring of 1964 a questionnaire survey was conducted in Omaha to ascertain the current immunization levels of certain high-risk groups including hospital personnel (?). According to the survey, which represented about half of the city's hospital employees, approximately 70 percent of the hospital employees were considered adequately immunized against poliomyelitis—the result of an extensive community immunization program conducted during the summer of 1962—but only about 25 percent were fully protected against smallpox, diphtheria, and tetanus. (Since tetanus immunization is usually given in conjunction with diphtheria immunization, it seemed logical to incorporate tetanus immunizations in the hospital program.) Physicians and nurses were found to be only slightly better protected than other hospital personnel.

In cooperation with the Omaha-Douglas County Medical Society, the Omaha-Douglas County Health Department and the Omaha Hospital Association initiated a comprehensive immunization program for hospital personnel during the spring of 1965. The purpose of the community hospital immunization program was to establish a comprehensive continuing immunization program for hospital personnel in the Omaha-Douglas County area and to demonstrate that such an immunization program is feasible.

### **Methods**

Details were worked out with each of the 13 Omaha area hospitals for implementing the program. The first phase was concerned with updating current employees' immunizations to maximum protective levels; the second provided for immunization of all new hospital employees at the time of employment.

Each hospital selected 2 days during a given 4-week period in which to provide booster inoc-

ulations for its employees before, during, and after working hours. Although the health department furnished some personnel, each hospital assumed responsibility for staffing its own clinic. The vaccines, disposable syringes, and other supplies were purchased by the hospitals. Promotional material and hospital and individual immunization record cards for the program were furnished to the hospitals by the health department.

Each clinic provided booster inoculations against diphtheria, tetanus, smallpox, and poliomyelitis. Adult type diphtheria-tetanus toxoid vaccine was given in one arm either separately or mixed with poliomyelitis (Salk) vaccine. (When mixed, the vaccines were combined in a disposable syringe just prior to injection.) Smallpox vaccination was given in the other arm by means of a multiple dose of freeze-dried vaccine.

Persons who had not received immunizations against diphtheria, tetanus, poliomyelitis, or smallpox in the past 4 years were considered inadequately protected and, if no medical contraindication was present, were urged to participate in the program. Employees under 21 years of age were required to present written parental consent to receive immunizations. Primary smallpox immunization in adults was given only on the request of a private physician.

One hospital had already initiated a comprehensive immunization program for its employees and did not sponsor booster clinics along with the other 12 hospitals. Of the remaining, all but one hospital, which charged its employees \$2.25 for the immunizations and also required each to present an immunization consent form signed by his private physician, provided inoculations free. All hospitals urged their staffs to participate in the program, and three made immunization mandatory. The health department did not recommend compulsory immunizations for staff presently employed but did advise that such a policy be considered for personnel subsequently employed.

### **Results**

Table 1 summarizes the results of the immunization program. A total of 11,231 immunizations were given to 4,447 persons. The percentage of employees immunized at each

**Table 1. Hospital personnel immunization against diphtheria, tetanus, poliomyelitis, and smallpox, Omaha-Douglas County, Nebr., 1965**

Hospital	Size of staff	Number immunized	Percent immunized	Total immunizations
A.....	1,382	761	55.1	2,059
B <sup>1</sup> .....	964	202	21.0	514
C.....	762	554	72.7	1,474
D <sup>2</sup> .....	762	518	68.0	774
E.....	700	455	65.0	1,220
F.....	534	372	69.7	968
G.....	523	431	82.4	1,146
H.....	499	391	78.4	1,068
I.....	424	215	50.7	579
J.....	343	162	47.2	444
K.....	318	151	47.5	389
L.....	190	133	70.0	340
M.....	153	102	66.7	256
Total.....	7,554	4,447	58.9	11,231

<sup>1</sup> Required a consent form from private physician and charged a fee for inoculations.

<sup>2</sup> Inoculations given throughout the year as part of a comprehensive program. Hospital did not, therefore, participate in the program.

hospital ranged from 21.0 to 82.4 percent with an overall rate of 58.9 percent.

Table 2 summarizes the number and percent of staff receiving each type of immunization. Approximately 57 percent of the hospital personnel received diphtheria-tetanus boosters, but only 43.4 percent received booster immunizations against smallpox. Of the people receiving some type of immunization, 97.5 percent received boosters against diphtheria-tetanus, 81.3 percent against poliomyelitis, and 73.8 percent against smallpox. The number of personnel immunized in each department is as follows:

Department	Persons immunized
Nursing service.....	1,788
Administration.....	636
Maintenance.....	517
Food service.....	468
Laboratory and pharmacy.....	301
Medical students.....	91
Physicians.....	72
Volunteers.....	56
Total (excluding hospital D).....	3,929

Ten hospitals requested assistance from the staff of the health department in conducting their programs, and a physician, health educator, public health advisor, and project nurse

from the department each spent approximately 12 hours per hospital during the program. Supplies, including vaccines and disposable syringes, cost an average of 60 cents per person or slightly more than \$200 per hospital.

No serious reactions of any type were reported by hospital employees. Only one employee missed work because of the immunization, and no hospital routines were disrupted.

### Discussion

Most authorities recognize the need for infant immunization and actively encourage and promote it. However, the concept that inoculation must be a recurring event throughout life has not been generally promoted, and giving boosters to adults certainly has not been established as routine practice in most communities. Because immunization has artificially upset the balance of nature by diminishing natural exposure to diseases, an older population, inadequately protected against illnesses which are preventable, has emerged.

Hospital personnel comprise a high-risk group in the adult population. Not only are inadequately immunized hospital personnel a vulnerable group, but they are also a potential threat to the community. Certainly an important line of defense against the spread of a preventable communicable disease must be within our hospitals. If all hospital personnel began to maintain a high level of immunity against diphtheria, poliomyelitis, and smallpox, an important step in preventing the spread of these diseases would have been taken. With the completion of the first phase of the hospital em-

**Table 2. Hospital personnel response to immunization program by type of immunization, Omaha-Douglas County, Nebr., 1965**

Type	Number given	Percent personnel participating	Percent participating personnel receiving specific immunization
Diphtheria-tetanus.....	4,335	57.4	97.5
Poliomyelitis.....	3,614	47.8	81.3
Smallpox.....	3,282	43.4	73.8

ployee booster immunization program, this step has been taken in one community.

The urgent need for beginning the second phase, that of inoculating new employees at the time of employment, was demonstrated soon after the conclusion of the first phase. In the emergency room of one hospital, three new interns and a newly-employed nurse administered mouth-to-mouth resuscitation to a child with a skull fracture who, unknown to them, harbored a virulent diphtheria organism. None of the four employees was adequately protected against diphtheria, and none had received a booster at the time of employment. However, each person was given prophylactic antibiotics and none contracted the disease.

The second phase of the program has proved more difficult to initiate than the first. One participating hospital, which was instrumental in initiating the first phase of the program, has worked out a system whereby each week all new employees are inoculated through the local department of health. However, most of the participating hospitals have not yet embarked upon the second phase of this program and its implementation may require that immunization of all new employees be made compulsory. Voluntary programs are most successful when immunizations are made available to large groups of persons at a given time, and the success of a simple maintenance program may depend on the use of different methods.

The need for a continuing hospital immunization program is obvious. The success of this program, however, like the success of any immunization program, will be determined by how convinced responsible health personnel are that immunization is a basic preventive health measure.

## Summary

The first phase of a comprehensive hospital employee booster immunization program was carried out in 13 Omaha, Nebr., hospitals during the spring of 1965. Booster immunizations against diphtheria, tetanus, poliomyelitis, and smallpox were given to 4,447 persons, or 58.9 percent, of 7,554 hospital employees. Of the persons participating, 97.5 percent received boosters against diphtheria and tetanus, 81.3 percent against poliomyelitis, and 73.8 percent against smallpox. No serious reactions were recorded. The cost of the supplies averaged 60 cents per person or approximately \$200 per hospital.

The second phase of the program, that of immunizing new employees at the time of employment, has not yet been initiated by most of the hospitals.

## REFERENCES

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